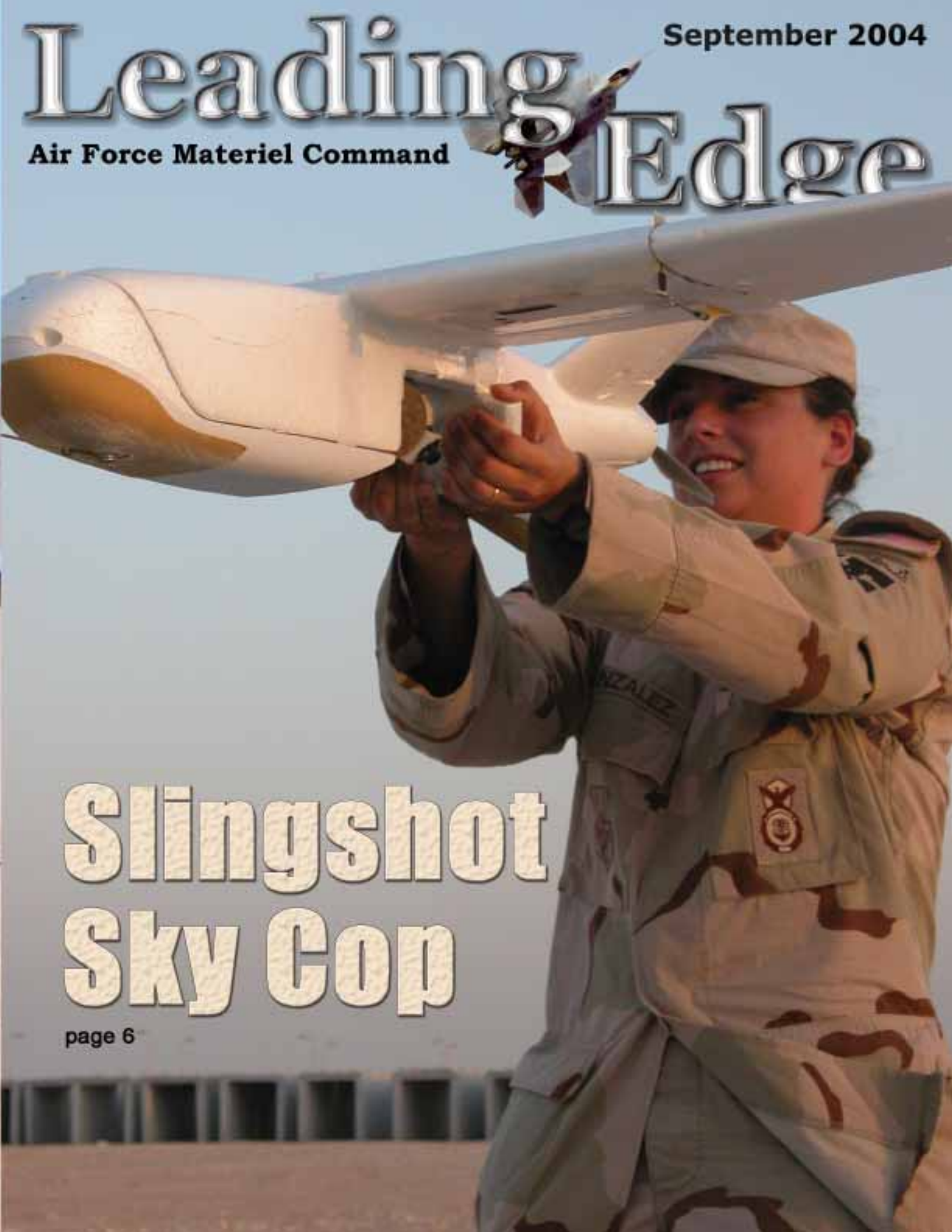
September 2004

# Leading Edge

Air Force Materiel Command



## Slingshot Sky Cop

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http://www.afmc-pub.wpafb.af.mil/HQ-AFMC/PA/leading_edge/index.htm

Cover photo by Staff Sgt. C. Todd Lopez

# September 04

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**LEADING EDGE**

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*Members of the Edwards Airborne Laser team install the last of two optical benches through the nose of the ABL aircraft — the YAL-1A. This bench contains optics needed to track and destroy hostile ballistic missiles during their boost phase of flight. (AF photo by Steve Sound)*

# Airborne laser update

EDWARDS AIR FORCE BASE, Calif. — The last assembly housing optics the Airborne Laser aircraft needs to track and destroy hostile ballistic missiles during their boost phase of flight were recently installed here.

Experts are putting the finishing touches on a Beam Transfer Assembly, the second of two large beam control optical benches for the Airborne Laser, according to Col. Ellen Pawlikowski, ABL program director.

The 6,100-pound BTA is located in the forward section of the 747 aircraft, just behind the ABL's distinctive nose turret, Colonel Pawlikowski said. It contains the main beam control sensors, as well as a series of mirrors used to compensate for atmospheric distortion and fix the megawatt-class laser on its target.

"We are pleased to have the bench in place," the colonel said. "Its installation brings us another step closer to our next flight-test series."

The Multi-Beam Illuminator bench, the first of the two benches installed, was positioned in the aircraft's mid section on May 6, Colonel Pawlikowski explained. The MBIL holds the optics required to control and direct the ABL's non-lethal tracking and atmospheric compensation laser beams.

"The BTA is a key component required to support the passive flight-test program scheduled to begin later this year," said Kevin Montoya, ABL Integrated Test Force project manager.

While engineers are working to install the optical system in the aircraft, laser experts are completing integration and "check out" of the Chemical Oxygen Iodine Laser in a separate building of the Edwards ABL ITF complex.

YAL-1A is preparing to resume flight tests by the end of 2004, launching for the first time since it was taken out of service for hardware integration in December 2002.

*— Airborne Laser and 95th ABW Public Affairs*

# WEARABLE COMPUTERS

ROME, N.Y. — Air Force Research Laboratory engineers are directing research to develop small, powerful computers military and civilian air traffic controllers can wear to help them monitor crucial information.

"This research is intended to develop and apply augmented reality and wearable computer technology to the problems of air traffic control," said Alexander Sarnacki III, program manager at the AFRL information directorate.

He said the technology will center on relatively powerful computers about the size of two decks of playing cards stacked together. Shipbuilders requiring access to voluminous blueprints currently use the hardware.

"Augmented reality technology will allow a tower controller to look through a lens such as goggles or eyeglasses and get information on aircraft they are observing — such as the type of plane and flight number," said Mr. Sarnacki.

"The lens could annotate what the controller is looking at by adding information such as weather conditions. The technology could potentially enhance a controller's ability to operate in low-visibility situations."

Mr. Sarnacki said wearable computer and augmented reality technology is envisioned to help integrate and assimilate the large amounts of information presented to air traffic controllers. This will provide controllers with an effective tool they can use to maintain situational awareness and make rapid, accurate decisions.

Experts from Information in Place, Inc., of Bloomington, Ind., will do the work under a nine-month "Military and Civilian Air Traffic Management Information Exchange and Visualization" contract. The agreement is funded under the federal government's Small Business Innovative Research program.

The Small Business Innovative Research program funds early-stage research and development at small, high-technology companies.

It's designed to stimulate technological innovation; increase private sector commercialization of federal research and development; increase small business participation in federally funded research and development; and foster participation by minority and disadvantaged firms in technological innovation.

*— AFRL Public Affairs*

## Around the command

☆☆☆☆ Gen. Gregory S. Martin

# AFMC reorganization:

## Where we are now ... where we are going

This month marks the beginning of my second year as commander of Air Force Materiel Command. It has been an exciting time to be part of AFMC, and I'm proud to serve with you. I would like to highlight a few of the milestones we've reached together over the past twelve months and mention a few goals we have for the future.

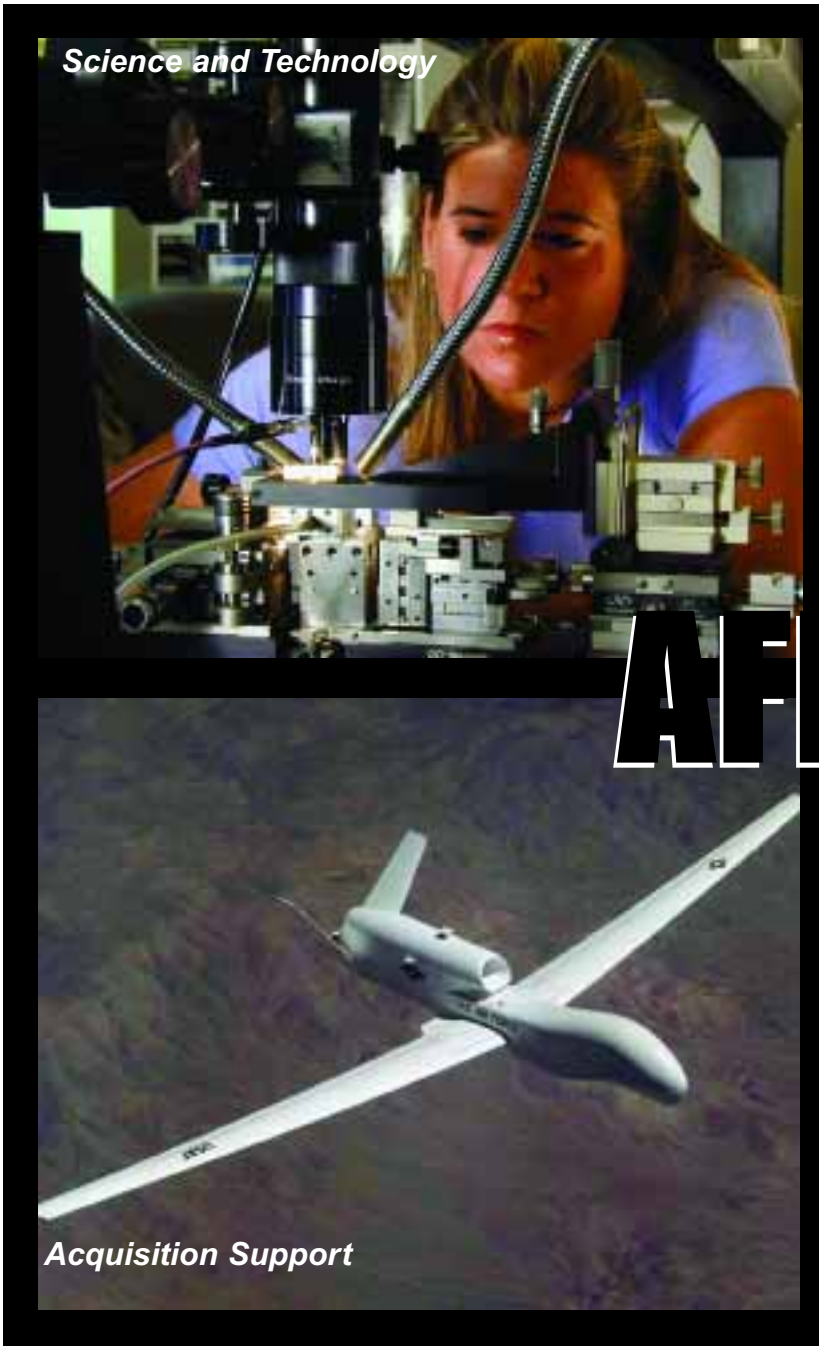
We have completed the restructuring of the AFMC headquarters. This transformation was necessary to ensure we can shape the workforce and infrastructure to develop, field and sustain war-winning expeditionary capabilities.

Our role in the headquarters is to support the field organizations by shaping the work force, providing policy, allocating resources and overseeing performance. As you can imagine, our job in the headquarters is different from the field organizations and that is what makes the headquarters mission different from the AFMC mission.

We evaluated the role AFMC plays in the Air Force and this led to a definitive AFMC mission statement:

**Deliver war-winning …**
**— Technology**
**— Acquisition Support**
**— Sustainment**
**... expeditionary capabilities to the warfighter.**

Early on, I was asked by our Chief, General John Jumper, to "explore a command construct for acquisition that mirrors other Air Force units." With that request, and a new AFMC mission statement defined, it was necessary to take a long hard look at how we were structured across the command. We discovered that there were areas that could be more productive and cost effective if the proverbial stovepipes were removed



and similar efforts were merged into more cohesive endeavors.

Let me give you an example to illustrate this concept. Let's say we were directed to install a new communication capability on all fighter aircraft. Currently, that might require four F-15 engineers, four F-16 engineers, four A-10 engineers, four F-117 engineers and four F/A-22 engineers all working to achieve successful program execution within their respective system program offices.

There is a good possibility that we might negotiate five separate contracts with unnecessary redundancy and some lessons learned on one platform may not be shared with the other platforms. Our ability to negotiate the best price for common equipment to be installed on all of the platforms is also greatly reduced.

What if those fighter platforms were structured as groups or squadrons in a Fighter Attack Systems Wing? We achieve a level of synergy within the fighter attack capability that makes us more effective. We become identifiable to the rest of the Air Force, and we could do it with perhaps eight engineers and one contract. To truly excel in our mission, we need to focus on capabilities versus individual weapon platforms.

The fighter attack scenario I described is just one example of the transformational philosophy we have put in motion. As we head into the next 12 months, we will be evaluating product centers, air logistic centers, laboratories, test and evaluation organizations, and specialized centers, as well as the HQ staffs of those organizations, for opportunities to excel to support the AFMC's mission.

I have identified five goals we all need to focus on throughout the command:

- **Develop and transition technology to maintain air, space and information dominance**
- **Develop, field, and sustain war-winning expeditionary capabilities on time, on cost**
- **Provide opportunities for career development and progression**
- **Operate quality installations**
- **Sustain a healthy, fit and ready work force**

Attaining these goals will enhance our ability to provide war-winning capabilities … on time, on cost.

Finally, I want to stress the importance of taking care of AFMC's people. This past year, both the Air Force Climate Survey and the AFMC Junior Force Study provided valuable insight into key issues impacting the morale and effectiveness of our work force. Two issues in particular stand out in my mind.

First, we need to make sure we are doing all we can to grow the future leaders of AFMC through effective mentoring. To be successful in this area we need to provide our junior force with the right training, education and experience and ensure the talented young men and women that make up our junior force understand how the important work they do contributes to the AFMC and Air Force missions.

I also want to emphasize just how important it is for each of us to take advantage of every opportunity to recognize the outstanding work our subordinates and coworkers are doing every day. While formal awards programs represent a vital, high-profile piece of the recognition picture, informal recognition is just as important to ensure our people know there efforts are valued and appreciated. Sometimes all it takes is a, "Thanks for a job well done!"

I'm very proud to serve side-by-side with you in the world's greatest Air and Space Force. Your achievements during the past year have been truly incredible, and I'm excited to be a part of the continuing excellence in AFMC.

*AF photos*

# Tiny top cover:

## ESC capability helps beef up security overseas

Staff Sgt. C. Todd Lopez
379th Air Expeditionary Wing Public Affairs

Airmen at one forward deployed location — engaged daily in a routine of work, chow and picking up laundry — may not think to look up in the sky. But if they did look up, they would see something looking right back at them.

Flying at about 300 feet above the ground is a small foam aircraft with a built in video camera. But the plane isn't there to spy on Airmen as they go about their efforts to support the war on terrorism. Instead, it's on its way to the perimeter of the installation, where it will fly about looking for suspicious activity. The craft serves as an eye in the sky for the force protection personnel deployed in Southwest Asia; it's another layer of security, a deterrent — it is the Desert Hawk.

"We fly the Desert Hawk at different times of the month, depending on what's occurring in the local area," said Senior Master Sgt. Nicholas Liberti, the Security Forces Operations Superintendent. "Desert Hawk is part of the Force Protection Airborne Surveillance System and is a force protection multiplier for the installation. It is a layer of defense that provides early-warning and detection ability."

The Desert Hawk, known officially as the Force Protection Airborne Security System, was developed by the Electronic Systems Center, Hanscom AFB, Mass., in response to an "urgent compelling need" sent by the Central Command Air Forces in February 2002. Within 180 days, CENTAF needed a base security capability to be delivered for almost immediate operational use, and ESC delivered.

The ESC team adopted what they termed a 'fast track' acquisition strategy and, by the end of February, awarded a sole source contract for the Unmanned Aerial Vehicle to Lockheed Martin. As an established contractor, Lockheed had the resources necessary to meet an aggressive development and production schedule.

"Lockheed put together a solid team," said Capt. Anh Le, Desert Hawk program manager. "The entire team burned the midnight oil to meet the capability requirements."

**"(Desert Hawk) is a force protection multiplier ... a layer of defense that provides early-warning and detection ability."**

**— Senior Master Sgt. Nicholas Liberti**
**Deployed in Southwest Asia**

The other key piece to the success of the rapid acquisition strategy was emergency funding. CENTAF sent nearly $3 million of Defense Emergency Relief Funds to ESC for the initial contract award.

Only 127 days after the contract award, Lockheed delivered 12 of 48 Desert Hawk units for testing and initial fielding, Captain Le said.

Physically, the Desert Hawk is not a big aircraft. It has a wingspan of about 52 inches, is less than three feet long and weighs approximately seven pounds. Its mission is pretty big, though.

"Without the Desert Hawk, we would have less ability to provide security against the man-portable air defense systems threat to the base," Sergeant Liberti said. "That's what this aircraft is designed to do, control the MANPADS threat."

Essentially, ESC designed the Desert Hawk to keep an eye out for bad guys with access to MANPADS. MANPADS are fairly easy-to-obtain, shoulder-launched weapon systems that have the capability to destroy or damage U.S. and Coalition aircraft.

Should the Desert Hawk see such a threat, local security forces respond with the right level of force.

"If the Desert Hawk does happen to fly over something, we can spot it at that moment and then dispatch Guardian units out to assess the situation," Sergeant Liberti said.

The FPASS program is run entirely by enlisted Airmen. Maintenance on the craft, launch and recovery efforts and even piloting of the bird are handled by specially trained volunteers from Security Forces. While FPASS program team members are still regular security forces, their program is a departure from the normal flight duties, said Staff Sgt. Nancy Gonzalez, FPASS program lead.

"What we do is very different from regular security forces work," Sergeant Gonzalez said. "But we still get to carry a weapon."

Sergeant Gonzalez has about 17 Desert Hawk flights under her belt. She said her favorite part of the job is putting the plane in the air.

"I think the launching and landing of the plane is the best part," she said. "You hook

*Staff Sgt. Nancy Gonzalez launches the Desert Hawk unmanned aerial vehicle. The Desert Hawk, developed by Electronic Systems Center, Hanscom AFB, Mass., is a small foam aircraft with a built-in video camera which helps security forces at this forward deployed location monitor the perimeter of the installation. The Desert Hawk operators slingshot the craft into the air with a 50 foot bungee cord. After it's launched and when it reaches 50 feet per second, the motor engages and the aircraft flies a pre-programmed path.*
*(AF photo by Staff Sgt. C. Todd Lopez)*

it up to a bungee cord, stretch it out and let it go."

According to Sergeant Gonzalez, it takes two Airmen to launch the Desert Hawk — a pilot and a copilot. The pilot holds the aircraft about five feet off the ground. The copilot attaches the end of a bungee cord to the plane and then walks away, stretching the cord tight and charging it with just the right amount of potential energy to launch it into the air.

The copilot wears a vest and helmet just in case the plane should launch into his chest instead of climb skyward.

The plane doesn't start out with the engine running, however. That doesn't happen until after it's shot into the air.

"After we launch, and it goes over fifty feet per second, the motor engages," Sergeant Gonzalez said. "After that, it flies itself on the path you have programmed."

The plane's battery power and tiny propeller can keep the craft in the air for approximately 60 minutes, she said.

The main body of the Desert Hawk is made of high-density foam and costs about $300. If it needs repair to its frame, Sergeant Gonzalez or members of her team take care of it.

"They do their own work on the bird if it breaks," Sergeant Liberti said. "They put the pieces back together and use glue or tape — whatever it takes to keep it flying. They do all the maintenance."

The team doesn't do repairs to the mechanics of the plane, however. It's the inner workings of the plane — the cameras, computers, servo motors and mechanical parts — that bring the cost to about $30,000.

Sergeant Gonzalez said problems with the inner workings of the craft are repaired by the manufacturer.

The Desert Hawk sees a lot in the sky during the day and night. In fact, ESC developed two models of the plane.

The first is equipped with a small digital camera that looks similar to what computer users may have on top of their monitor. The camera transmits images via radio wave back to the ground control station.

Sergeant Gonzalez and her copilot can watch the images on a small video screen and record them to video tape. Another Desert Hawk model is equipped with an infrared camera. Like a Security Forces Airman with a set of night vision goggles, the nighttime Desert Hawk can see in the dark.

"The plane provides real-time footage, day or night, of the exterior of the base," Sergeant Gonzalez said.

Control of the aircraft comes from a portable ground control station. Instead of flying with manual inputs by a pilot, the Desert Hawk flies a predetermined route programmed in to its onboard control system with the aid of a laptop computer.

Using an onboard global positioning system receiver, the Desert Hawk is able to keep itself on the course its programmed to fly. That means that the operator on the ground isn't really telling the craft where to go once it's in the air. But that doesn't mean it can't be reprogrammed in mid-flight. In fact, being able to do so is critical to the Desert Hawk mission.

"I don't steer the plane," Sergeant Gonzalez said. "But if I see something suspicious, I can program it to go elsewhere. I can also have it hover overhead and move the camera to view."

Landing the Desert Hawk is a bit different than landing a regular airplane, because it has no wheels.

Instead of coming in for a traditional landing, it comes in for what amounts to a controlled crash.

Sergeant Gonzalez must ensure the wind, terrain and angle of descent are all correct and may have to do several passes before the plane can be brought home safely. Still, should the craft come down hard, it is pretty tough.

"It has Kevlar protection on it," Sergeant Liberti said. "But when it quits flying, it falls like a rock."

The Desert Hawk is not as expensive, or as sophisticated as its bigger siblings, the Global Hawk or the Predator. It can't fly as far, and it can't deliver munitions. But its mission is as important to ground based security forces in deployed locations as the bigger craft are to the Air Force as a whole.

"This is nothing on the grand scale of the other UAVs," Sergeant Liberti said. "Still, this is an extremely important program. It is another layer of security on the base. It is a deterrent. It is another set of eyes that can detect potential hostile activity."

Since the initial development of the system, ESC has exercised options on the contract to field a greater number of Desert Hawk units, which now total nearly 130. The center continues to improve and upgrade the system with new capability to better meet the warfighter's operational requirements. ESC is currently working on upgrades that will lengthen mission duration, make the system more rugged, and provide better imagery.

*(1st Lt. Stephen Fox, ESC Public Affairs, contributed to this report.)*

*Gen. Gregory S. Martin, Air Force Materiel Command commander (left) and Chief Master Sgt. Vickie Mauldin, AFMC command chief, enter one of the many ceremonies they've attended together. Chief Mauldin, who followed General Martin to AFMC at his request, retired Aug. 20, after serving 30 years in the Air Force. (Courtesy photo)*

# saying farewell

## AFMC command chief retires

Tech. Sgt. Carl Norman
AFMC Public Affairs

Air Force Materiel Command's top enlisted leader walks away from the only organization she's ever worked for as an adult Aug. 20, retiring from the Air Force after more than 30 years.

Chief Master Sgt. Vickie Mauldin has spent the last year advising Gen. Gregory S. Martin, AFMC commander, on all aspects of the command's 20,000-member enlisted force. She and General Martin worked together three and one-half years before coming here as United States Air Forces in Europe command chief and commander, respectively.

At retirement, she'll hang up a uniform she's worn since August 1974. She said she's going to take 11 days off before starting work Sept. 1 for a Forth Worth, Texas, civilian company's marketing department. There she'll put her decades of experience to use, helping that company relate more effectively with enlisted members of all branches of service.

Chief Mauldin's career has taken her to duty in five states and three foreign countries, first as a maintainer specializing in avionics, then as a command chief master sergeant. She took on AFMC's command chief duties in August 2003, following General Martin at his request.

Thinking about retirement and ending the Air Force chapter of her life, the chief said joy, sadness and a sense of accomplishment and loss are flooding her soul.

"I don't know any life other than the military, and I've loved every minute of it," she said, recalling entering the Air Force at the ripe old age of 18 years and 2 days. "My dad served in the Navy in World War II, and I have uncles who served in Vietnam, so I grew up listening to stories about service, camaraderie and watching each other's back. I wanted to be a part of that, so military service was a natural step.

"The thought of a little ole country girl from West Virginia, who graduated high school with the same people she went to grade school with, becoming part of and retiring from an organization that spans the world is awesome."

In February 1998, Chief Mauldin crossed the career bridge to the command chief special duty, taking on her first such duties at Third Air Force headquarters, Royal Air Force Mildenhall, England. That change came with mixed emotions.

"It was a difficult decision in some ways because becoming a command chief removes you more from the one-on-one interaction, and I loved that as a chief," she said. "But at the same time, it gives you the ability to influence policy, and that affects more than just the one-on-one relationships, it affects units, wings, numbered Air Forces and major commands and ultimately the entire Air Force. That's what reminds me of the great responsibility I have to the men and women of the Air Force."

In looking back on her time in AFMC, the chief said she's seen pride grow and develop and people are standing a little taller and feeling great when you talk to them about how much they mean to the Air Force.

"I'm proud of what AFMC people do and that we're so strong in supporting the warfighter in every aspect. When I was in USAFE I didn't realize then, but I do now, that they and a lot of other combat commands cannot do their jobs without AFMC giving them the tools, weapons, systems and software they need to do it. I'm very proud to be part of the command that helps make USAFE, Air Combat Command and Air Mobility Command so good at what they do."

And as the chief readies herself for the next chapter of her life, she offered some advice for the Air Force's future leaders.

"Young men and women today are much savvier about how to do things, how to get along and how the world works," Chief Mauldin said. "My advice is to take that knowledge and ability and continue to grow and make it work.

And as the dust settles on Chief Mauldin's career, her hopes are people will remember her as someone who truly cared about them, who put their needs before her own and who wanted to see them be successful.

"I couldn't be more proud to retire out of AFMC because I truly believe the rest of the Air Force does ride on the back of this command," she said. "It doesn't get much better than AFMC."

# Virtual Environment

## Experts at Hanscom AFB create a real-time battlefield

Daryl Mayer
ESC Public Affairs

Warfighters in three U.S. time zones recently honed their skills together, in real time, thanks to a virtual environment Electronic Systems Center experts at Hanscom Air Force Base, Mass., developed.

The scenarios came about via the Critical Area Air Defense initiative — a system that creates a virtual environment to assess Homeland Air Defense capabilities and limitations in a particular area. C4ISR Enterprise Integration office experts developed it, with Raytheon Integrated Defense Systems officials serving as prime contractor and technical lead.

"The purpose was to provide operators and warfighters the capabilities to address operational questions and limitations concerning air defense command and control," said Brig. Gen. Katherine Roberts, C4ISR Enterprise Integration office director.

*In the heat of virtual battle, a pilot in an F-15 simulator at Raytheon's War Gaming lab in Tucson, Ariz., gets his orders to engage a hostile aircraft. During the Phase 3 summit, pilots, controllers, and commanders from bases all over the nation were connected via a virtual commucations network created by engineers at Electronic Systems Center, Hanscom AFB, Mass. The simulator pictured above, which is being flown by Maj. Tom O'Berg, is located at Elmendorf AFB, Alaska. (AF photo by Tech. Sgt. Keith Brown)*

Integrated across the Joint Distributed Engineering Plant, or JDEP, the initiative linked sensors, command and control operators, pilots and commanders across the nation in real time, said Kari Perez, JDEP program manager. During the third phase of the initiative's development experiment components and rehearsals were residing in three separate time zones, yet each participant shared a common operating picture.

The Joint Air Defense Operation Center, run by North America Air Defense experts at Cheyenne Mountain, Colo., and Army Defense Artillery, set up in the Raytheon facility in Bedford, Mass., were the hub of activity during Phase 3, Ms. Perez said. The NORAD baseline air defense was represented by ESC in the C4ISR Enterprise Integration Facility and Raytheon System In-the-Loop facility in Bedford.

In the heat of the virtual battle, when operators needed data from an AWACS, it was supplied from the Boeing AWACS simulator in Spokane, Wash., she said. When officials directed an F-15 to engage a hostile aircraft, the orders seamlessly flowed to an actual pilot sitting in a simulator in the Raytheon War Game Laboratory in Tucson, Ariz.

"They interacted and became interoperable in a Distributed Mission Operation setting," said Lt. Col. Steve Boe, 1st Air Force, Southeast Air Defense Sector.

"Rehearsing and experimenting in a virtual environment is less expensive than shipping everything to a training location," said Ms. Perez.

She added that it also eliminates the need to adjust for normal airspace traffic and allows operators to test the full kill-chain, including engaging the target and post-attack assessment.

During Phase 3, operators identified areas in the NORAD software that needed improvement.

"They wouldn't have found those items otherwise because they wouldn't stress the systems as much as we were able to do," said Ms. Perez.

Participants for phase 3 included a broad cross section of Air Force, including 1st Air Force and Northern Command Air Forces organizations. Phase 3 also integrated the Army's Avenger air defense system simulator, as well as a representation of the Secret Service participation in the CAAD architecture, according to Ms. Perez.

Phase 4, scheduled for February 2005, is expected to integrate the Navy's Aegis Combat System and the Joint Strike Fighter.

# WIRE WINDING WONDER

*(Inset) An employee at Hill AFB, Utah, hand winds an exciter stator for an aircraft — a task that normally takes around 17 hours to complete and often leads to debilitating injury. (Below) Ron Smith, a mechanical engineer at the base, operates a machine which can do the winding in less than an hour. Hill AFB is currently the only AF installation using the Trison Exciter Stator Winder. (AF photo by Matthew Weinstock)*

Dennis Bessire
OO-ALC Technical Writer

Winding wire onto generator parts by hand — a tedious and sometimes painful process — might soon become a thing of the past, thanks to a computerized machine being tested in the electronics division's generator rewind shop at Hill Air Force Base, Utah.

Dale Ballard, airborne generator section chief, and Mike Messier, generator rewind supervisor, discovered the machine while visiting Hamilton Sundstrand, original equipment manufacturer for generators overhauled at Hill AFB, in San Juan, Puerto Rico, in early 2003. They were so impressed by the effectiveness of the winder that they worked to attain one for government use.

The Exciter Stator Winder, manufactured by Trison Machinery Ltd., uses touch screen technology to wind wire onto the generator part in 55 minutes — a process that currently takes employees 12 to 17 hours to complete.

Without the machine, a group of eight people, supervised by Mr. Messier, hand-wind exciter stators. The employees rotate every two hours, always making sure at least two people are winding.

Exciter stators are a vital component of the generators that supply the power needed to operate various electrical systems within the aircraft. The parts require the careful attention of Air Force employees who must be sure that both the tension of the wire and the number of turns are perfect.

In addition to the amount of time it takes to complete just one exciter stator, the hand-winding is further complicated by the risks involved. So far three employees have suffered Carpal Tunnel Syndrome, causing time missed at work, but also the expensive surgeries that can be required to fix the problem.

And there is always the risk that the employees who do the hand-winding will become incapable of anything but light duty after developing Carpal Tunnel.

The electronics division has received full approval to use the winder, which is the first such winder to be used in the Air Force. Hill AFB officials were working with logistics management directorate officials at Tinker AFB, Okla., to clarify winding requirements based on the improved consistency and quality that is found on test exciter stators wound on the new machine.

After the stator is wound, it still takes an additional hour to attach the leads; however, time to complete the exciter stator is reduced by as much as 15 hours. With the winder doing all of the work, there are no more worries about consistency with tension or applying the correct number of turns.

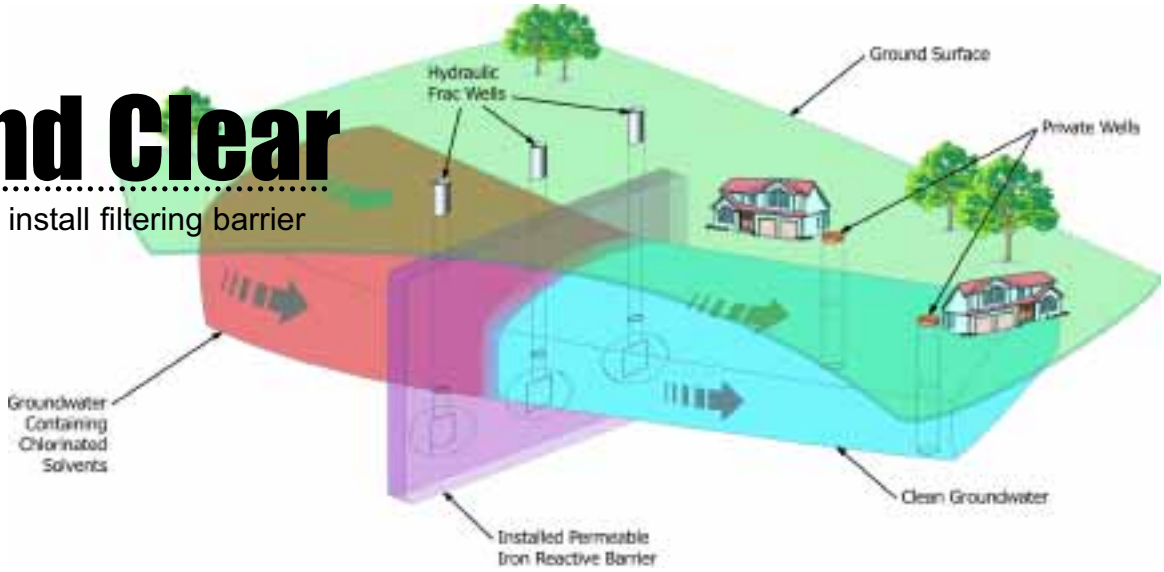
"This makes for safer, better and more efficient exciter stators in aircraft generators," said Ron Smith, mechanical engineer assigned to acquire and implement this new technology. "It's now possible for one person to complete four stators in the average nine-hour shift — easily a more than 400 percent increase in production," he said.

"With the work area as busy as it is, Mr. Messier and his staff can focus on other areas without having to worry about winding."

# Clean and Clear

## Tinker environmentalists install filtering barrier

Brion Ockenfels
OC-ALC Public Affairs




***This graphic illustrates the Permeable Reactive Barrier. The 500 foot wall recently installed at Tinker AFB, Okla., filters contaminates out of ground water. (AF graphic)***

Tinker Air Force Base, Okla., environmentalists are using a new method to clean up a nearby community's groundwater contamination. By injecting iron filings into the ground, scientists are making a 500 foot long filtering barrier.

Called Azimuth Directed Hydraulic Fracturing, the new injection technology creates a Permeable Reactive Barrier that eliminates contaminants from groundwater deep below the surface. Environmental directorate experts are using the technology to help clean up a contaminated groundwater plume.

The contaminates migrated from a sludge pit on top of an on-base landfill used during the 1950s and 1960s. At that time landfills weren't required to conform to such strict environmental standards as they are today, environmental experts said.

The PRB consists of iron filings injected into the ground via a specially designed well casing installed 100 feet below the ground surface, according to Scott Bowen, Tinker hydrogeologist and project manager. The iron filings react with the contaminants, decreasing their concentration or eliminating them.

"The name 'barrier' is kind of a misnomer," Mr. Bowen said. "The reactive barrier or wall is not designed to stop the flow of ground water, but instead allows it to flow through and cleans it as contaminants are oxidized or neutralized by the injected iron filings."

"In fact, we purposely design the barrier to be more porous than the surrounding soil, which allows the ground water to pass through easily," said Grant Hocking, president of GeoSierra who developed the technology.

The work plan, developed in part by Tinker environmental engineers, received praise from the regulatory agencies.

"Tinker has a very proactive restoration program," said Oklahoma Department of Environmental Quality regulator Robert Replogle.

The barrier technology has produced clean-up rates of greater than 99 percent in other clean up programs similar to Tinker's, Mr. Hocking said.

Environmental restoration experts created the barrier by first mixing iron filings with a food-grade starch, which creates a gel similar to a very thick yogurt.

According to Mr. Hocking, mixing the gel to the right consistency is needed to transport and evenly disperse the iron in the ground.

Within a few hours, the food-grade gel breaks down to harmless sugars and water, leaving in place the iron filings, forming a wall about 4 inches thick, he said. As the groundwater passes through the iron, the chlorine molecules are stripped from the solvent, transforming the contaminated plume to clean water as it exits the barrier.

According to Mr. Bowen, the technology's advantages include safe and nearly dust-free installation, no maintenance after installation, no energy source required for operation, and once installed, the land above the barrier will be replanted with grass.

Mr. Bowen said by next spring, the area will look undisturbed and begin to make its transition back to nature.

***Chad Given, a contractor at Tinker AFB, Okla., inspects specialized bore hole casings with Scott Bowen, Environmental Management directorate hydrologist and project manager. A down-hole camera inspection ensures specially designed casings were properly aligned along a determined direction. Long silver tubes are placed in each bore hole and become part of the specially designed casing, which stays in the ground. The tubes direct the flow of injected iron rich gel, which will become the permeable wall. (AF photo by Brion Ockenfels)***

# AFMC Warfighters

## An 'explosive' deployment

Airman 1st Class Mark Woodbury
95th ABW Public Affairs

During a recent deployment to the Middle East, two Airmen from Edwards Air Force Base, Calif., put their lives on the line disposing of Improvised Explosive Devices. But for Staff Sgt. Neil Gertiser, 95th Air Base Wing Explosive Ordnance Disposal unit NCO-in-charge of resources, and Senior Airman Stephen Szczurek, 95th ABW EOD equipment, the danger of the mission never crossed their minds. Instead, they saw it as their big break.

"It really was a once-in-a-lifetime opportunity for me," said Airman Szczurek. "For someone in my career, this was an opportunity to see things I never would have while serving stateside … an opportunity to put into action what I have learned."

"We volunteered for the deployment because we realized the types of skills learned from this deployment would put our training into practice and better our careers overall," Sergeant Gertiser added.

One of their primary responsibilities was to sweep the runway after their base came under attack. The team also ensured any ordnance found was disposed of and any damage was reported.

"Many of the attacks were from 107 millimeter and 122 millimeter rockets that the attackers would modify and shoot in the direction of the base," said Airman Szczurek. "Because of the modifications, the shots were not always accurate, but amazingly they would get lucky and some would hit the base."

Sergeant Gertiser said the base they were deployed to came under attack at least 40 different times keeping him and his partner very busy.

*Senior Airman Stephen Szczurek, 95th Air Base Wing Explosive Ordnance Disposal unit, snapped this picture as he traveled past a pipeline bomb explosion on a road just outside the base where he was stationed during his deployment to the Middle East. Airman Szczurek was one of two EOD technicians from Edwards AFB, Calif., who recently returned from a 90-day deployment. (AF photo by Senior Airman Stephen Szczurek)*

There was one close call off base, Sergeant Gertiser said.

"A local citizen stopped our convoy and tipped us off about a roadside IED that was placed a few yards ahead of us. Had it not been for him, we may never have found it until it was too late. I am very thankful for his help."

Airman Szczurek says another of the more memorable days during the deployment was when a rocket landed near the munitions storage area and started a fire that eventually spread to ammunition holding pads, causing several major explosions on base.

"Amazingly, no one was injured," said Airman Szczurek. "Everyone abided by their training and took cover, resulting in no major injuries."

The duo recalled another plus to their deployment — working with the Army Corp of Engineers.

"It was a good opportunity to see how other branches operate and to build camaraderie between the services," said Sergeant Gertiser. "We couldn't do it without them and they couldn't do it without us.

"We provided the expertise on ordnance removal and destruction, while they provided manpower and security to get the job done."

Currently, Sergeant Gertiser and Airman Szczurek are preparing for the unit compliance inspection at Edwards AFB in October. As for deploying again in the near future, the sergeant says he'd love to but doubts it'll happen.

"Deployments in Iraq and Afghanistan are great opportunities, but the reality is we need to spread the wealth and send other EOD technicians so they can garner the same knowledge we did."

# CSI: ON THE BATTLEFIELD

Melissa Winthrow
AFRL Public Affairs

Some of today's most popular television shows feature crime scene investigation, but those pale in comparison to the real-life battlefield investigations an Air Force Research Laboratory scientist carries out.

In his role in the Air Force Reserve, Maj. Greg Moster, whose civilian job is with AFRL's air vehicles directorate, is assigned to the Joint Combat Assessment Team — an elite 20-member group charged with delving into what type of explosive devices cause various vehicle battle damage.

*(From left) Maj. Greg Moster, Lt. Col. Brindisi and Maj. Bartkowiak are standing near the Baghdad airport passenger terminal next to the damaged left wing of the DHL A-300 aircraft hit in November 2003. While deployed to Iraq supporting the 3rd Marine Aviation Wing, the team assisted the ongoing DHL A-300 investigation. (AF photo)*

Air Force organizations around the globe call on the team's unique abilities, according to Major Moster. And so do those from other services and branches of government, like the Department of Homeland Security for example.

"This type of work has been around since Vietnam, but has died out quite a bit in years past," he said. "It took on a whole new life when operations in Iraq started."

Major Moster said when the deployment call comes, he and his crew go to where the damaged vehicle is and start their examination.

Damaged vehicles can be anything from jeeps and tanks to helicopters and other aircraft.

The first step, he said, is to review and access the actual damaged aircraft; then, collect weapon fragments and other evidence and send it for metallurgy analysis.

Those go to either the Missile and Space Intelligence Center in Huntsville, Ala., or the National Ground Intelligence Center in Maryland, depending on whether team members feel the suspect weapon is land or air based.

"We also swab for chemical residue at the site and send it for analysis at a lab the Department of Homeland Security operates," he said. "That helps identify the type of explosives used."

Major Moster said he and his crew spend years studying the "finger prints" various types of missiles, grenades and so on leave — much like the television CSI teams look for certain pieces of evidence untrained eyes can't detect.

That personal identification, along with the metallurgy and forensics — like the chemical analysis — allows them to piece the puzzle together and identify what type of device damaged any particular vehicle.

"The physical damage looks different with each threat," Major Moster said. "I can pretty much tell you what class of device was used just by looking. It's the metallurgy and other forensics that confirm our suspicions."

In the past, JCAT has investigated high profile cases such as Trans World Airlines Flight 800, which in July 1996 exploded shortly after takeoff from New York en route to Paris, as well as the F-117 Nighthawk lost in Kosovo in 1999.

In their latest assignment, Major Moster and two other JCAT team members spent six weeks deployed with the 3rd Marine Aviation Wing in Iraq. While en route to meet with the Marines, team members also answered a request by the U.S. State Department and the Department of Homeland Security to help in the on-going investigation of a DHL A300 aircraft hit by a missile over Baghdad in November 2003.

Throughout their deployment, the team, supported by the Missile and Space Intelligence Center and the Transportation Security Administration, used their crime scene investigation techniques and forensics to examine battle damage to the 3rd MAW's aircraft.

After determining what caused the damage, Major Moster and his colleagues then work with the impacted unit's intelligence officers and tacticians to coordinate tactics to counter the threat.

"For example, should they fly lower or higher?" he said. "If they fly lower, they may take more small arms fire, but if they fly higher, they're more prone to taking missile hits. We help them decide where they want to be and provide them more information so they can make that decision more rationally."

In addition to helping the Marines in this situation, Naval Air Systems Command experts used the teams' findings to determine the battle worthiness of certain Navy aircraft systems. Where possible, naval officials use the information to modify certain systems and make them more resistant to threats like the 3rd MAW unit encountered in Iraq.

The team's abilities and findings benefit everyone from the Air Force Materiel Command researcher to the people who control service funds, Major Moster said.

"Our investigations help determine how military units are engaging the enemy," he said. "We can see where the weaknesses are in a particular weapon system and that helps AFMC do a better job in reducing the vulnerabilities in those particular areas.

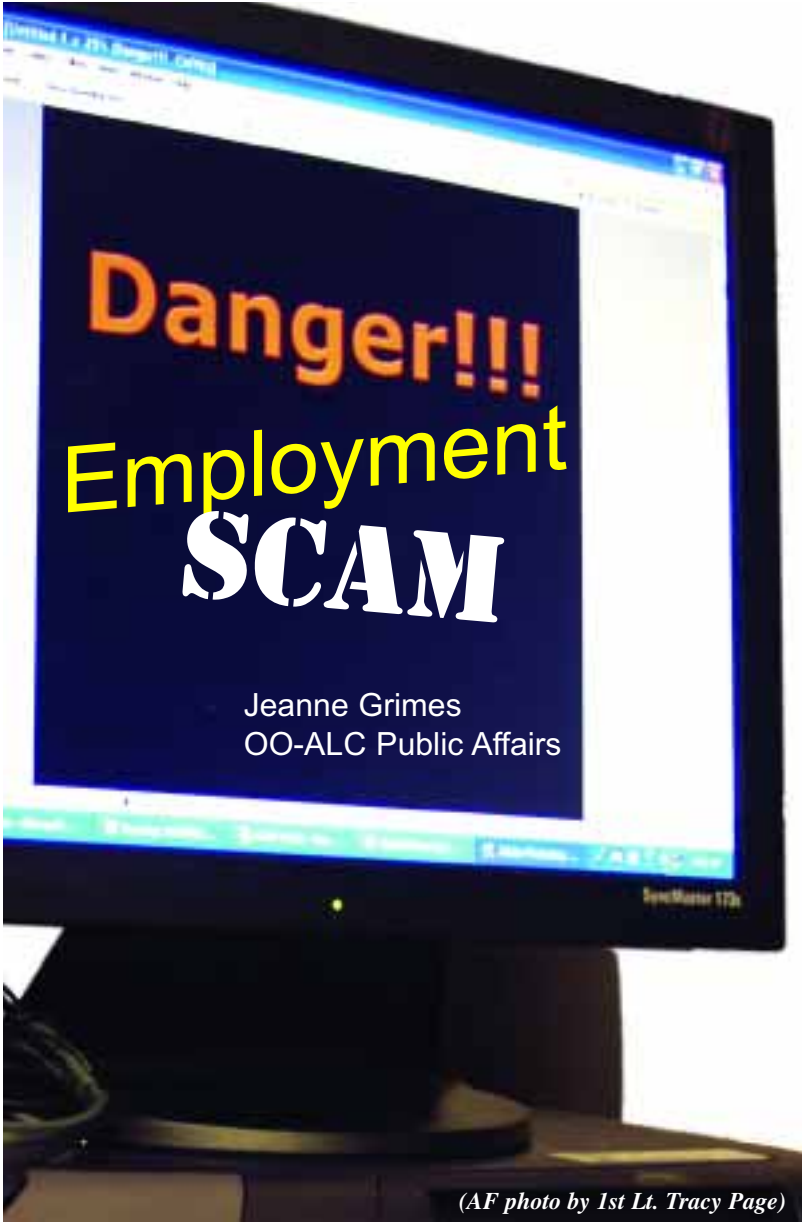
"It can also help decrease the number of resources lost, help put more bombs on target and help Air Force leaders better determine where to put money so more lives can be saved."

At AFRL, Major Moster is the leader for the Reusable Military Launch Systems Team, a joint effort between the Air Force, National Aeronautics and Space Administration and contractors to design and evaluate access to space vehicles like the Space Shuttle.

Due to the classified nature of his Reserve job, the major, a real-life rock scientist in his civilian job, cannot reveal many details about how many times he's TDY and where he goes. However, he said he's grateful for the support he received from his civilian supervisors and co-workers because as a non-standard Individual Mobilization Augmentee, he serves much more than the traditional one weekend a month, two weeks per year commitment.

"The Air Force has been very understanding and very supportive," he said. "I enjoy what I do very much and am glad it benefits others."

*(Tech. Sgt. Carl Norman, AFMC Public Affairs, contributed to this report.)*



*(AF photo by 1st Lt. Tracy Page)*

Posting his resumé online seemed a savvy move for one Airman from Tinker Air Force Base, Okla.,who planned to finish up his time in the military, move home to Dallas and begin college.

However, instead of leads to gainful employment, the experience took Senior Airman Christopher Kissell perilously close to the unwanted role of computer scam victim. Now he wants his experience to be a warning to other service members re-entering the civilian world.

"It's a terrifying situation," said the Airman, a medical administrator with the 72nd Medical Group. "How many like me are out there? A percentage of people, I'm sure, will fall for it."

He said it all began when he posted his resume on Monster.com. The resumé included the fact that he speaks Chinese.

"I got a reply from this company saying (it was) looking for someone to help out with international relations," he recalled.

That initial e-mail referred to the resumé. The Airman was informed Chempacon GMBH, the purported company in Lautenbach, Germany, didn't require him to have a college degree, just a willingness to work. The position, it continued, required someone who was bilingual and experienced at working with peers in other countries.

Airman Kissell received a condensed application to fill out and fax to the company. Included was a request for faxed copies of his driver's license and social security cards. The Airman complied, but first he blacked out the numbers.

"All this time, I was going through an 'interview' process and would get e-mails from company contacts," he said. "They said they'd love to hire me, but wanted me to give them my social security number for tax reasons."

By then, warning bells were echoing in Airman Kissell's mind. He went to an online search engine, typed in "Chempacon GMBH" and was shocked at what he uncovered.

"Every result I found warned, 'Beware. This is a scam. Job seek fraud,'" he said.

Determined to learn more, the Airman kept his discovery to himself and e-mailed the company, asking for a job description.

What came back shocked him again — this time that the company considered him gullible.

"They were going to send me foreign checks to deposit in my personal checking account," Airman Kissell said, adding he would then send the company a wire transfer for the amount of the check, less $600.

"I said, 'No,'" he continued. "It was my only redeeming remark."

He'd already learned from his research that the checks for tens of thousands of dollars were no good and anyone who deposited one in his or her bank account and then withdrew the funds to complete the wire transfer was held responsible for the bank's loss when the check bounced.

Airman Kissell alerted the Air Force Office of Special Investigations, as well as filed a fraudulent business complaint with the FBI. He also complained to Monster.com and similar Web sites, including Jobsearch.com and Employment.com.

Airman Kissell feels he came away from the encounter a wiser man. As a precaution, he cancelled all his credit cards and reopened accounts with new numbers.

His job search continues, but he's taken it from online to personal. On weekends, he drives to Dallas to hunt for jobs the old fashioned way.

"You have to research anytime you're looking for a job," he said. "Nothing beats a sit-down face-to-face with a potential employer."

## Information Assurance Tips

- ◆ If something looks too good to be true, it probably is.
- ◆ Network administrators will never ask for your password. Anyone asking for it probably is up to no good.
- ◆ Banks and other financial institutions will not request credit card information via e-mail.
- ◆ Any information on your computer is subject to theft. Protect information through encryptions, passwords or other methods, or don't put it on your computer.
- ◆ Never open an e-mail or attachment from someone you don't know.
- ◆ Employ a personal firewall and anti-virus protection to your home computer to protect it from the multitude of threats on the Internet.

***Coston Smith, AFMC Information Assurance***

# Hollywood hotshots hoop it up at Edwards

EDWARDS AIR FORCE BASE, Calif. — Celebrities from popular television shows, movies and the music industry played an informal basketball game here recently to show support for military members and their families.

Entertainers like Ice Cube, Tia and Tamera Mowry, Bill Bellamy and Brian McKnight were just a few of the names who made the trip from Los Angeles to compete in this year's NBA Entertainment League event.

This game was the third in three years and the celebrities appeared to have just as much fun as the military members and their families watching from the stands.

"It is always a pleasure to entertain the people who hold it down for us," said Brian McKnight, rhythm and blues artist.

Bill Bellamy, actor, added, "We're here to provide some good entertainment, meet some cool people, and support the troops — it's a good thing."

And they had encouraging words for those deployed.

"Come home safe, and we're proud of what you're doing," said Ice Cube, hip-hop artist.

The game was one-sided in the beginning, with the white team taking a quick lead.

In the second half, the blue team tied it up, sending the game into overtime. The blue team won by two points, 59-57.

Although his team did not win, Benito Martinez, actor, said he was glad he made the trip out here. "We want to do whatever we can to support the troops."

*— 95th ABW Public Affairs*

***D.J. Clue, a hip-hop artist, drives down the court during the NBA Entertainment League basketball game held at Edwards AFB, Calif., recently. (AF photo by Senior Airman Jet Fabara)***

# "Little Boy" returns to USAF Museum

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — A poignant symbol of World War II history returned to the Air Force Museum in July after a year of restoration to make it more historically accurate.

Officials at Sandia National Laboratories in New Mexico painted the "Little Boy" atomic bomb and added parts so it more accurately reflects its World War II-era configuration. The bomb is now on display in the museum's Air Power Gallery, which features aircraft, exhibits and items dedicated to the U.S. Army Air Forces in World War II.

A Little Boy bomb was the first nuclear weapon used in warfare. The B-29 "Enola Gay" dropped such a bomb over Hiroshima, Japan, on Aug. 6, 1945. It detonated at an altitude of 1,800 feet.

Shipping, refurbishing and returning the bomb involved a coordinated effort among representatives from the museum, Air Force Nuclear Weapons and Counterproliferation Agency, Sandia and the 4th Airlift Squadron at McChord Air Force Base, Wash.

Air Force Nuclear Weapons and Counterproliferation Agency experts served as project coordinator, facilitating actions between the museum and Sandia, which restored the item. A 4th AS aircrew returned the item to Wright-Patterson AFB in a C-17 Globemaster.

The 4th AS is the sole operator of Air Mobility Command's Prime Nuclear Airlift Force, routinely handling the nation's most sensitive cargo. It is the Air Force's oldest active airlift squadron.

*— USAFM Public Affairs*

***KIRTLAND AIR FORCE BASE, N.M. — Middle school students, fronted by lead walker Gerald Romo, work to step in unison as part of a team-building exercise during a curriculum day at the AF STARBASE® La Luz Academy. The academy was implemented to enhance the Air Force Research Laboratory's Tech Transfer for Education program. The innovative education program works with students throughout the state to gain student interest in math, science, engineering and technology. (AF photo by Todd Berenger)***

*Tech. Sgt. Miguel Ortega-Llarena from Eglin AFB, Fla., shown during his deployment to Iraq recently. In July, the sergeant was chosen as one of the Air Force's 12 Outstanding Airmen of the Year for 2004. He is assigned to the 96th Security Forces Squadron Charlie flight. (AF photos)*

# Eglin cop among the elite

1st Lt. James Madeiros
AAC Public Affairs

Eglin Air Force Base, Fla., is a base where nothing is left to chance — from developing and testing weapons for the warfighter, to protecting endangered species on a massive land and sea range complex. However, one Eglin Airman believes chance may have played a part in singling him out of more than 16,000 peers in Air Force Materiel Command.

"I think it's luck," said Tech. Sgt. Miguel Ortega-Llarena, 96th Security Forces Squadron flight chief, who was named one of 12 Outstanding Airmen for 2004. "It wasn't something I even expected. I'm still somewhat in shock."

Considering the steps it takes to reach the top 12, you can't help but feel lucky, said Sergeant Ortega-Llarena.

Once a package is submitted, competition begins at the squadron level. In the sergeant's case, the next step was the 96th Mission Support Group, which included Airmen in the logistics, services and mission support squadrons. From there, his package was considered at the 96th Air Base Wing and then Air Armament Center level. Then, at the command level, Sergeant Ortega-Llarena was examined by a board.

"We had a board with three members," he said. "They ask you questions, check your uniform and check your records."

After meeting the approval of the board, he proceeded to the Air Force level, in essence moving to compete and succeed among 359,000 of his fellow Airmen. While these successive victories were a surprise for Sergeant Ortega-Llarena, the initial shock came when he returned from his deployment to Al Jaber, Kuwait.

"When I won it for my squadron, I was still [deployed]," he said. "I didn't know about it until I got back."

Sergeant Ortega-Llarena spent six months deployed to the Middle East as a fire-team leader, finding himself first in Kuwait, but quickly being tasked to forward-deploy to Tallil, Iraq, and eventually Baghdad. His duties there included leading area patrols — which resulted in improved intelligence — and participation in a coalition assault as a fire-team leader in Baghdad.

"We were there to secure the people and provide protection for the resources, and then when we were forward-deploying into Iraq, we had to make sure our convoys were safe and that all of our people got there safely," he said.

During his deployment, Sergeant Ortega-Llarena continued his schooling despite his hectic work schedule.

"He was hands-down our best representative," said Master Sergeant Bob Barlow, 96th Security Forces Squadron anti-terrorism officer, and Sergeant Ortega-Llarena's supervisor at Eglin AFB."He accomplished a lot while he was [deployed], completing his school for the Community College of the Air Force, taking college courses after he had completed CCAF, plus maintaining the job that he had. That was a tremendous effort."

As the flight chief of the 96th SFS Charlie flight, Sergeant Ortega-Llarena manages almost 80 troops whose responsibilities include gate duty, responding to alarms and calls, protecting assets on the flightline, and patrolling the base. With an estimated 9,000 base residents, and 20,000 civilian and military personnel working at Eglin AFB, security forces are always in motion.

"Every single day it changes," he said. "It's never the same, which is good because it keeps you on your toes."

At the end of the day, being an Outstanding Airman does not change the way Sergeant Ortega-Llarena approaches his job, or how he feels about the team who he believes led him to the honor he received.

"I'm just humbled by the whole experience," he said. "It's a testament to my troops, especially to my flight. I owe huge thanks to them because of what they've done, and their accomplishments."

The 12 Outstanding Airmen of the Year will be honored during the Air Force Association national convention in Washington, D.C., this month and will serve as members of the AFA's enlisted advisory council for the next year.

# Serving those in need

Master Sgt. Darlene Foote
SSG Public Affairs

While many people don't mind spending several hundred or even thousands of dollars on a vacation at a resort location, not many are willing to dish out that kind of money to go somewhere to live in bare bone conditions and work without pay.

However, that is exactly what Maj. Stephen See, Deputy Staff Judge Advocate at Standard Systems Group, Maxwell Air Force Base, Ala., did — not once, but three times — most recently this past summer.

Over the last three years, Major See has spent nearly a combined two months working in Zimbabwe and Mozambique building wells, distributing supplies and working at AIDs clinics.

Since there are almost 30 different languages spoken in the region, the major had to have at least two interpreters with him at all times just to have a conversation.

"My interpreter would translate what I said into Portuguese and another would translate the Portuguese to the tongue of whom I was trying to communicate."

According to Major See, the trip was a success and the groundwork was laid for other teams to come in and provide the same kind of support and compassion that he and his team did.

"This trip was quite rewarding," Major See said, "especially at those moments when we really connected with the people despite the language differences."

***Maj. Stephen See, an attorney at Standard Systems Group, Maxwell AFB, Ala., traveled to Mozambique in June to provide critical assistance to local inhabitants. (From top) Maj. See impresses some Muslim Kotis by greeting them with "Salam Alakuh," an Arabic greeting he learned while deployed to Oman. Maj. See introduced himself to some Koti villagers through his translator, Michael. The major traveled in a dow — a small sailboat designed by Arab merchants hundreds of years ago. The dow is still the primary way to travel the islands off the Mozambiquean coast. Maj. See and his translator, Michael, meeting with city officials and neighborhood leaders. (AF photos)***

# SUPER HERCULEAN.

*A C-130J Super Hercules flown by the 815th Airlift Squadron, 403rd Wing, Keesler AFB, Miss., taxis on a dirt strip at Ft. Irwin, Calif. The C-130J is similar to the previous C-130s only in appearance. The J-model flies from shorter runways, climbs faster, and flies higher and faster with more payload capacity than any earlier models, bringing greater warfighter capability to the war on terrorism.*
*(AF photo by Tech. Sgt. James B. Pritchett)*

AFMC